Bossier Parish Community College
Master Syllabus

Course Prefix and Number: PHSC 106 **Credit Hours**: 3

Course Title: Elemental Chemistry

Course Prerequisites: Math 098 or Math ACT of 18

Textbook: American Chemical Society; Chemistry in Context, 6th edition.

Course Description:

An introduction to chemistry through its role and practical applications in society. Foundations of chemistry will be presented in non-traditional sequence in the form of environmental, medical, industrial, and other scientific topics and case studies. Designed for non-science majors with a minimal background in chemistry, this course will also focus on improving the student's ability to communicate scientific topics in a classroom setting.

Learning Outcomes:

At the end of the course, the student will be able to

A. comprehend established foundations of chemistry and apply them to observed natural processes;
B. utilize the foundations of chemistry to proficiently explain natural phenomena and hypothesize opinions on a variety of real-world issues; and
C. interpret and critically analyze quantitative data and measurements and qualitative, evidential facts in support of real-world topics from a chemical aspect.

To achieve the learning outcomes, the student will

1. define chemistry and defend it as the "central science". (A)
2. describe matter as being pure (elements and compounds) or a mixture. (A)
3. describe the composition of matter quantitatively as percent composition. (A)
4. compare historical scientific data and formulate hypotheses to explain observed trends.(A,C)
5. evaluate the role of natural and anthropogenic contributions to the earth's atmosphere, interpret historical data, formulate hypotheses, and extrapolate future predictions. (B,C)
6. describe the role of the ozone layer, its degradation, and measures to minimize its depletion. (B)
7. describe the makeup and structure of matter from its simplest form to its most complex. (A)
8. understand the organization and layout of the Periodic Table, and provide evidence of its continuous development. (A)
9. distinguish between different types of compounds (ionic and covalent) and explain observations in terms of chemical bonding. (A)

10. evaluate the reliability of measurements and data in terms of accuracy, precision, and significant figures (A)
11. formulate useable conversion factors to convert from the English system of measurement to the Metric system, using the factor-label method. (A)
12. convert numerical data into scientific notation, and perform associated mathematical calculations. (A)
13. describe basic atomic structure its relation to the Periodic Table. (A)
14. describe the earth's atmosphere, its role in sustaining life on earth, and the flow of energy between and within the earth/atmosphere/sun system. (B,C)
15. identify chemicals involved in the production of greenhouse gases, and their role in global climate conditions. (B)
16. describe atomic structure in terms of subatomic particles, and interpret atomic symbols, including, atomic number, mass number, charge value, and average atomic mass. (A)
17. explain global measures addressing climate change, and critically discuss the merits of statements supporting such measures. (B,C)
18. distinguish between renewable and non-renewable energy resources. (B)
19. explain the nature of chemical energy, its storage, release, and harnessing by humans. (A, B)
20. distinguish between endothermic and exothermic chemical processes.(A)
21. compare and contrast the forms of energy used worldwide and their impact on local and global environments (B).
22. describe the molecular structure of water, its unique chemical and physical properties, and its role in sustaining life on earth. (A,B)
23. predict the solubility in water of compounds based upon chemical structure. (A)
24. investigate the purity levels of various sources of water, and the societal impact of purity standards. (B,C)
25. define the terms acid and base, and explain their relative strength based upon the degree of dissociation in water. (A)
26. recognize and be able to correctly predict the products of an acid/base neutralization reaction. (A)
27. distinguish between a strong and weak acid (or base). (A)
28. describe the phenomenon of acid rain and its effects on society and the environment.(B)
29. explain the role nitrous oxides (NO_x) and sulfur dioxide (SO_2) play in the creation of acid rain. (A,B)
30. outline the currently proposed mediation techniques for combating acid rain and the relative effectiveness of each. (B,C)
31. describe the process of radioactivity in terms of nuclear stability. (A)
32. compare the relative energies involved in alpha, beta, and gamma nuclear decay. (A)
33. provide a general historical perspective of nuclear energy use worldwide, and the potential for its increased future use. (B,C,D)
34. describe the use of nuclear energy as an energy source, its potential to replace other conventional energy sources. (A,C)
35. describe the process of electron transfer in reduction/oxidation reactions. (A)
36. explain the general form of galvanic and voltaic cells, and their use in society. (A,C)

37. discuss the issues related to development of a hydrogen-base energy economy. (B,C)
38. discuss the feasibility of increasing the use of photovoltaic (solar) cells as an energy source. (B,C)

Course Requirements

- minimum score of 80% on in-class presentation
- minimum score of 80% on homework portfolio
- minimum 75% on comprehensive final exam

Course Grading Scale:

A- 90% or more of total points, a minimum score of 80% on student in-class presentation, a minimum of 80% on submitted homework portfolio, and a minimum of 75% on the comprehensive final exam.

B- 80% or more of total points, a minimum score of 80% on student in-class presentation, a minimum of 75% on submitted homework portfolio, and a minimum of 70% on the comprehensive final exam.

C- 70% or more of total points, a minimum score of 80% on student in-class presentation, a minimum of 70% on submitted homework portfolio, and a minimum of 65% on the comprehensive final exam

D- 60% or more of total points, a minimum score of 80% on student in-class presentation, a minimum of 65% on submitted homework portfolio, and a minimum of 60% on the comprehensive final exam.

F- less than 60% or more of total points, less than 80% on student in-class presentation, less than 65% on submitted homework portfolio, and less than 60% on the comprehensive final exam.

Reviewed by K. McNamara/May 2009